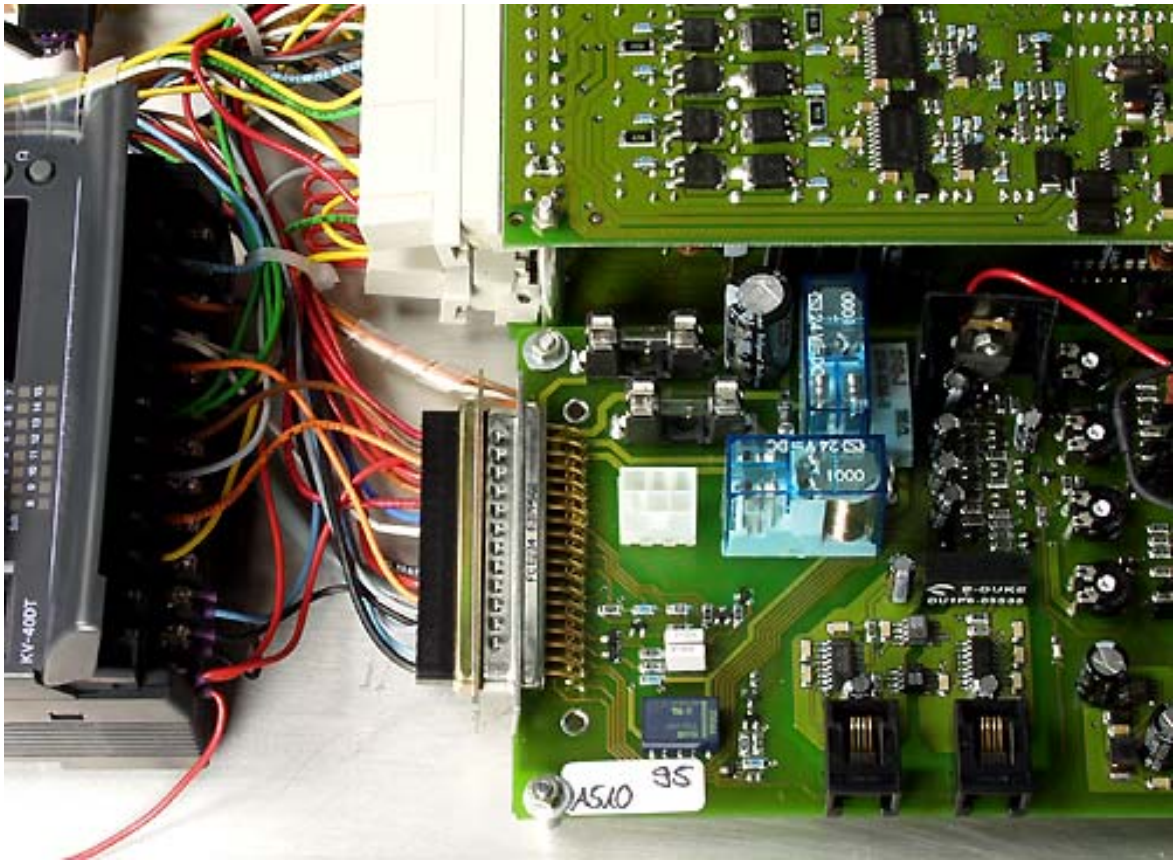
LPT 220

Service Manual



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PREFACE

General

The LPT220 Service Manual is distributed to LiCONiC trained and authorized personnel only.

All tasks described in this manual shall only be carried out by LiCONiC authorized System Integrators and Service Technicians.

Definition

System Integrator: Authorized person or company responsible for installation, initial start up and overall safety of the system.

Person or company to carry out service and maintenance tasks and therefore to be contacted in case of any problems with the system.

Service Technician: Authorized person to carry out service and maintenance tasks.

Operator: Any person who uses the equipment for its intended purpose.

Target Group

LiCONiC authorized System Integrators and Service Technicians.

Qualification, Training

To be qualified for instrument installation and servicing, you must

- read and understand the instructions in this Service Manual
- read and understand the instructions in the LPT220 Operating Manual
- have appropriate Service and Operator training
- have attended a FACTS software training
- know the relevant safety rules and regulations.

Service Documentation

- LPT220 Service Manual

1 Safety Instructions

Importance of the Safety Instructions

This chapter only contains general information regarding safe installation and servicing of the LPT220. More specific instructions in regard to safety are given throughout this manual, at the respective locations where observation is most important.

Strictly follow all Safety Instructions in this publication.

In case of safety relevant deficiencies, the manufacturer must immediately be informed.

1.1 Warning Notices

Throughout this publication, Warning Notices are to be interpreted as follows:

WARNING

Indicates the possibility of severe personal injury, loss of life or equipment damage if instructions are not followed.

The Icon Type indicates which kind of danger a person or equipment is exposed to.

CAUTION

Indicates the possibility of severe equipment damage if instructions are not followed.

NOTE

Gives helpful information about the equipment.

1.2 General Safety Regulations

Chemical, Biological and Radioactive Hazards

WARNING

The instrument might be contaminated from the liquids used in the application!

For servicing, use rubber gloves and, where necessary, other protective means!

A potential risk may arise from the liquids that have been handled on the instrument. Strictly apply appropriate safety precautions according to general laboratory and applicable local, state and federal regulations.

For your own and any other affected person's safety, make sure the instrument or parts have been thoroughly decontaminated prior to executing any maintenance task on the instrument or before sending it or parts of it for repair. Provide a filled-out Decontamination Form (Operating Manual Appendix A).

Disposal of Waste

Handling and disposing of waste has to be in accordance with all local, state and federal environmental, health, and safety laws and regulations.

Instrument

CAUTION

Before connecting or disconnecting the LPT220, always switch the Logistics Workstation off first.
Electronics of the Carousel will be damaged if done while the instrument is switched on.

Disconnect the RS232 interface only with power switched off.

Barcode Scanner

WARNING

Laser Class 2. Laser light - do not stare into the beam.
Might be harmful for your eyes.

1.3 EU-Conformity

LiCONiC AG provides a *Manufacturer's Declaration* upon delivery of the Carousel.

In Europe, the System Integrator must provide a *Conformity Declaration* covering the whole system upon final installation.

2 Transport

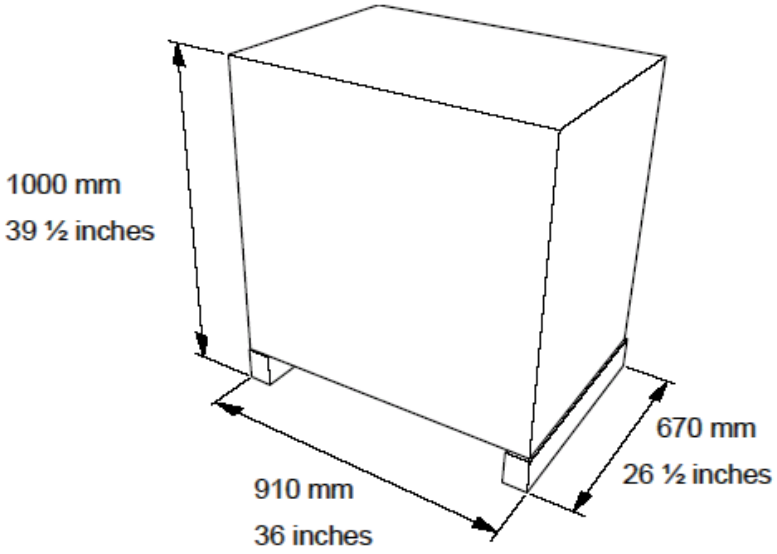
The LPT220 is a precision instrument. Handle with care.

Always use original packing for shipping the instrument!

2.1 Weights and Measures

Weight comlete with packing: 82.5 kg/182 lbs

Figure 2 - 1 Box Dimensions



Please find the complete Instrument Specifications in the LPT220 Operating Manual 391 209 Chapter 1.

2.2 Lifting

Whenever possible, move the Box by means of a fork-lift.

For replacing the unpacked instrument, refer to Operating Manual Chapter 8.

3 Installation

3.1 Site Requirements

The LPT220 and the GENESIS Workstation must be installed on a common surface. This surface must be straight and level.

For space requirements, please refer to the LPT220 Operating Manual P/N 391 209 Chapter 1.

3.2 Unpacking

To avoid later claims about incomplete or damaged deliveries, but also to instruct the user, the latter should be present while the instrument is unpacked. Together with the service technician, he should check the packing list and confirm correct and complete arrival of all parts.

3.2.1 Visual Check

Visually check all parts and packaging for damage sustained during transportation. If such are found, the customer must immediately file a complaint with the transport agency. Damaged packaging must be saved. If possible, damages should be photographed.

Please inform LiCONiC about all occurrences of transportation damages. Such information is important to further improve packaging.

3.2.2 Packaging Material

LiCONiC instrument packaging is designed as to avoid damage during transportation. Packaging materials should, if possible, be kept for reuse at a later stage. Since customers cannot be expected to keep voluminous original packaging, the LiCONiC representative should be capable to provide it upon request.

3.2.3 Unpacking the Instrument

Figure 3 - 1 Unpacking the instrument

Open the box and
- remove filler box
- remove handler padding
- lift off box

Remove the accessory boxes and lift the instrument off the pallet. Consult the Operating Manual Chapter 8 for instructions on how to carry the instrument.

Figure 3 - 2 Unpacking accessories

Boxes contents:
- 1 stack
- Transparent cover
- 2 cables DB25 - DB25 F/M (RS 232)
- 1 power cable 24 V
- Test sheet
- Packing list
- Operating Manual 391 209
- Handling instructions 391 220
- Junction plate with screws
- 4 stacks
- 4 stacks

CAUTION

Stacks are delicate - always handle them with extreme care!

3.3 Installation

3.3.1 Software

Install the FACTS Software Package as described in the FACTS Software Manual P/N 391 252.

3.3.2 Hardware

Junction Carousel - Workstation

Unscrew (2 screws) and remove the right worktable access door of the Workstation. Fasten Junction Plate with two countersunk head screws to the worktable right side. Unscrew and remove the Carousel housing panel. Push the Carousel against the Workstation, screw the Carousel frame onto the Junction Plate.

Transparent Cover

Slide the two nuts in the provided groove, center and tighten.

Figure 3 - 3 Installation Transparent Cover

Transparent Cover

Slide nut into groove

3.3.3 Electrical

CAUTION

Observe precautions for handling electrostatic discharge sensitive devices.

Connect the Carousel to Workstation and Computer with the cables supplied in the shipping kit:

Bar Code <=> Computer Serial Interface

Handler <=> Computer Serial Interface

24V DC <=> Optiboard

4 Instrument Set-up

In order to perform the tasks in this Chapter, it is essential to be famliar with the FACTS Software.

4.1 Instrument Configuration

Carry out the following tasks according to the relevant description in the FACTS Software Manual.

- Configuration of Carousel and Barcode Scanner (FACTS Data Base Manager)
- Initialization (Init)
  Configuration Tool > *Carousel* > *Test Module:* type *Init*
  Carousel performs two full rotations
- Teach the RoMa Vector for the Carousel
  Configuration Tool > *Carousel* > *Test Module:* type *ShowHandler*
  => Linear Handler in Transfer Position
  Teach vector
  type *HideHandler*

The Carousel is now ready for operation.

5 Preventive Maintenance

5.1 Cleaning

CAUTION

To clean instrument surfaces (e.g. Rotating Plate, Stacks etc.), always turn off the power by switching off the Workstation.

CAUTION

Strong detergents might dissolve casing surface coating.

5.1.1 Cleaning Agents

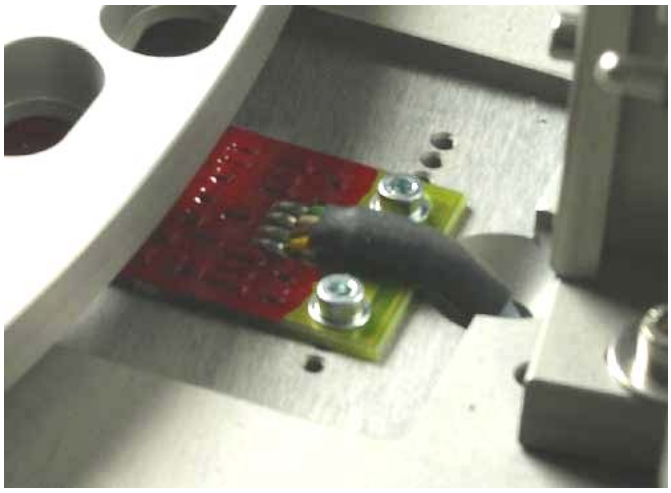
Alcohol: Use Ethanol, 2-Propanol or Isopropanol.

Instrument part	Agent	See
Scanner output window	Alcohol	Operating Manual
Lift guide	None	
Lift rack	None	
Shovel guide	None	Operating Manual
Belt, Belt residue	None	Section 5.1.2

5.1.2 Cleaning Tasks

Rotating Plate

Figure 5 - 1 Removal of belt residue



Remove belt residue:

Remove residue from Rotating Plate Sensor sing a small, dry brush.

Wipe lower edge with dry, lint-free cloth.

5.2 Lubrication

Before applying any lubricant, thoroughly clean parts to be lubricated using a lint free tissue.

5.2.1 Lubricants

Use one of the following lubricants (DIN 51825 KP2K) for Lift Guide, Lift Rack and Shovel Guide:

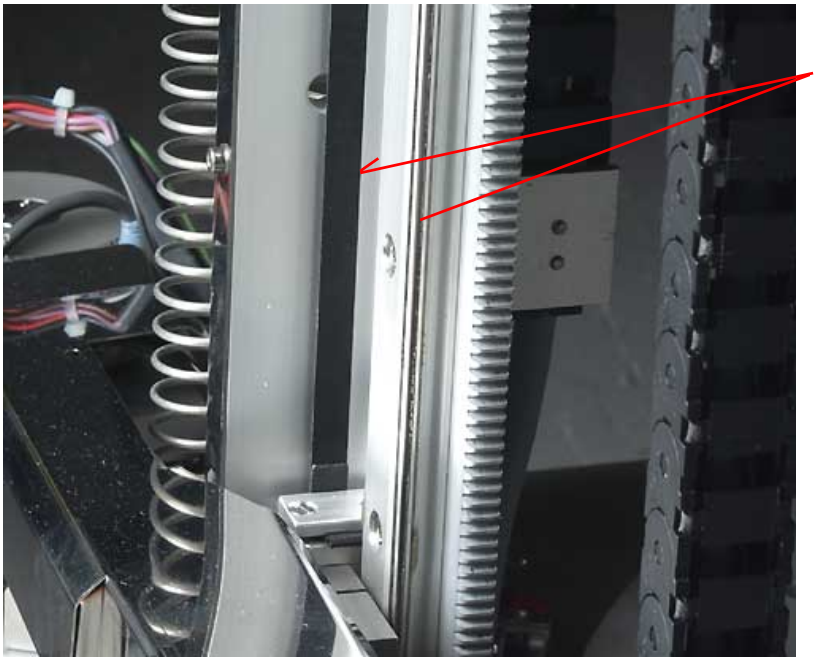
- KLUBER Paraliq GA351
- SHELL Retinex A
- MOBIL Savavex Grease L2

CAUTION

Too much grease will lead to malfunctioning of the instrument and/or contaminate liquids in the microplates.

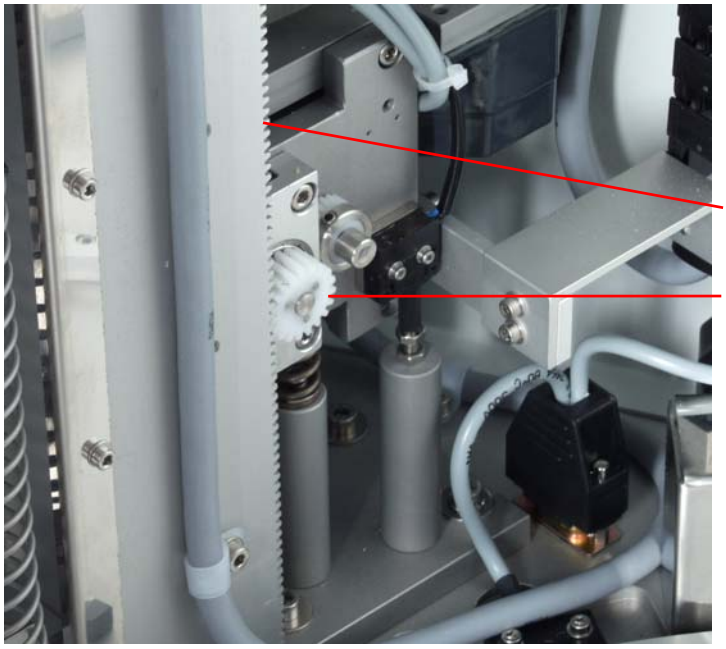
5.2.2 Lift Guide

Figure 5 - 2 Lubrication of Lift Guide



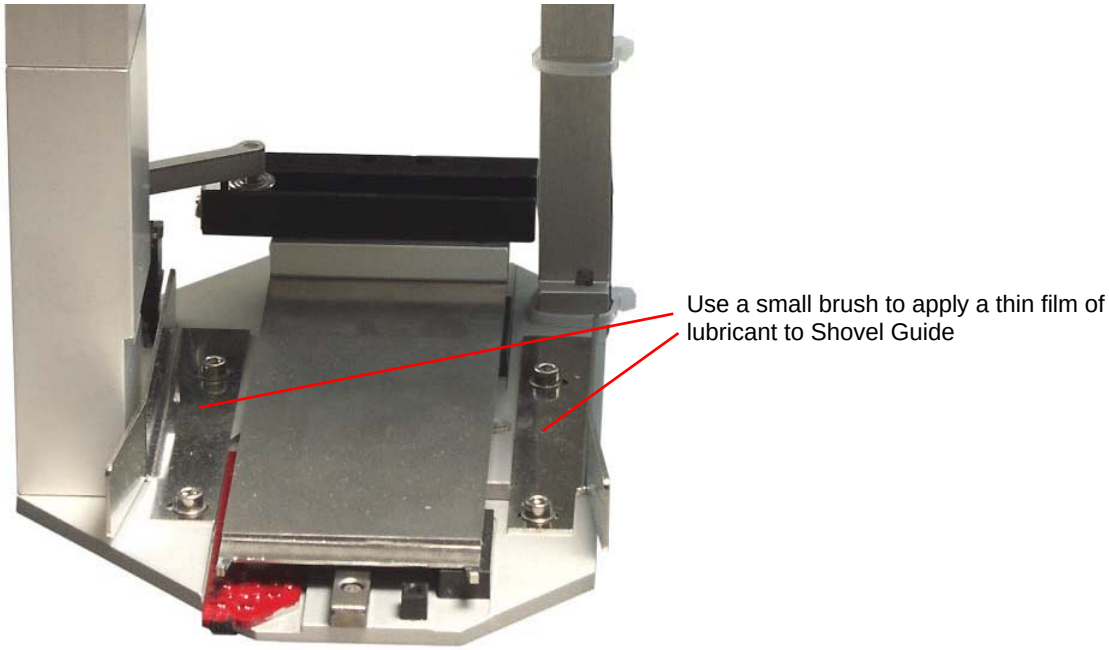
5.2.3 Lift Rack, Teflon Gears

Figure 5 - 3 Lubrification of Teflon Gears, Lift Rack



5.2.4 Shovel Guide

Figure 5 - 4 Lubrification of Shovel Guide



5.3 Periodic preventive maintenance

Item	Service Interval		Further Reference
	6	12 months	
Belt	A	R	
Lift guide	C/L	C/L	Section 5.2.2
Lift rack, gears	C/L	C/L	Section 5.2.3
Shovel guide	C/L	C/L/A	Section 5.2.4

L: Lubricate C: Check / Clean

R: Replace A: Check / Adjust

6 Troubleshooting

Table 6 – 1 Troubleshooting guide

Problem / Error	Possible Cause	Corrective Action
Rotating Plate positioning error	Belt slack	Tighten belt, se Section 7.3.5
	Covers on plate positioning holes are reflecting	Turn cover(s) over, see page 7 –1
	Rotating Plate Sensor malfunctioning	Clean (see Section 5.1.2) or replace Sensor
Wrong shovel – RoMa plate transfer position	Carousel has moved in relation to workstation	Align instruments Re-teach RoMa Vector
		Check transfer position in FACTS Configuration Dialog
	Screw fixing shovel arm to motor shaft is loose	Tighten screw – see Section 7.3.3
	Disk not centered in sensor slot	Center disk – see Section 7.3.3
Wrong shovel – stack plate transfer position	Wrong shovel end-position	Adjust shovel position – see Section 7.3.1
Barcode not read	Dirty output window	Clean
	Y/B Board or Decoder Board defect	Replace defective board
	No signal	Exit FACTS, switch off instrument – restart system
	Barcode unreadable	Check Barcode Settings in Configuration Dialog Check if barcode meets the specs
	Scattered light	Dim causing light source
Lift hits top of handler	Pitch Height does not match number of positions defined FACTS	Correct Pitch Height

7 Repair

7.1 General Instructions

Before carrying out any tasks described in this chapter:

WARNING

Switch the Workstation off, disconnect the mains power plug.

Switch the Computer off.

Disconnect the Carousel from the Computer.

WARNING

Make sure the Instrument has been decontaminated.

When handling any electronic components:

CAUTION

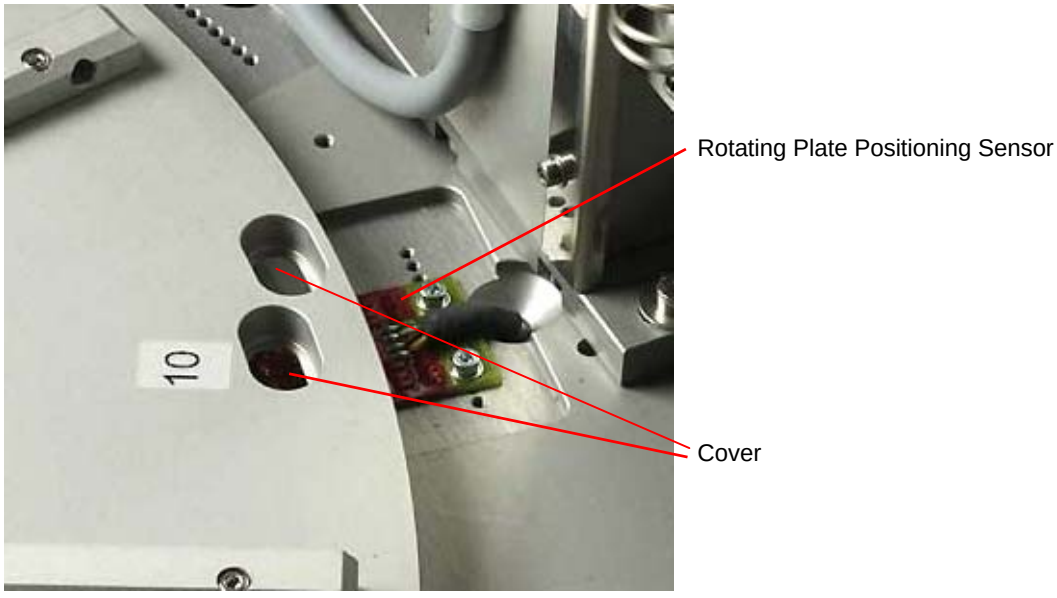
Observe precautions for handling electrostatic discharge sensitive devices.

Covers on plate positioning holes

The covers in the rotating plate keep the Rotating Plate Positioning Sensor from being actuated by scattered light.

Make sure they are all in place, the mat surface facing down.

Figure 7 - 1 Plate positioning hole cover



7.2 Replacing of Parts

7.2.1 Electronics Boards

Unscrew and remove the housing panel.

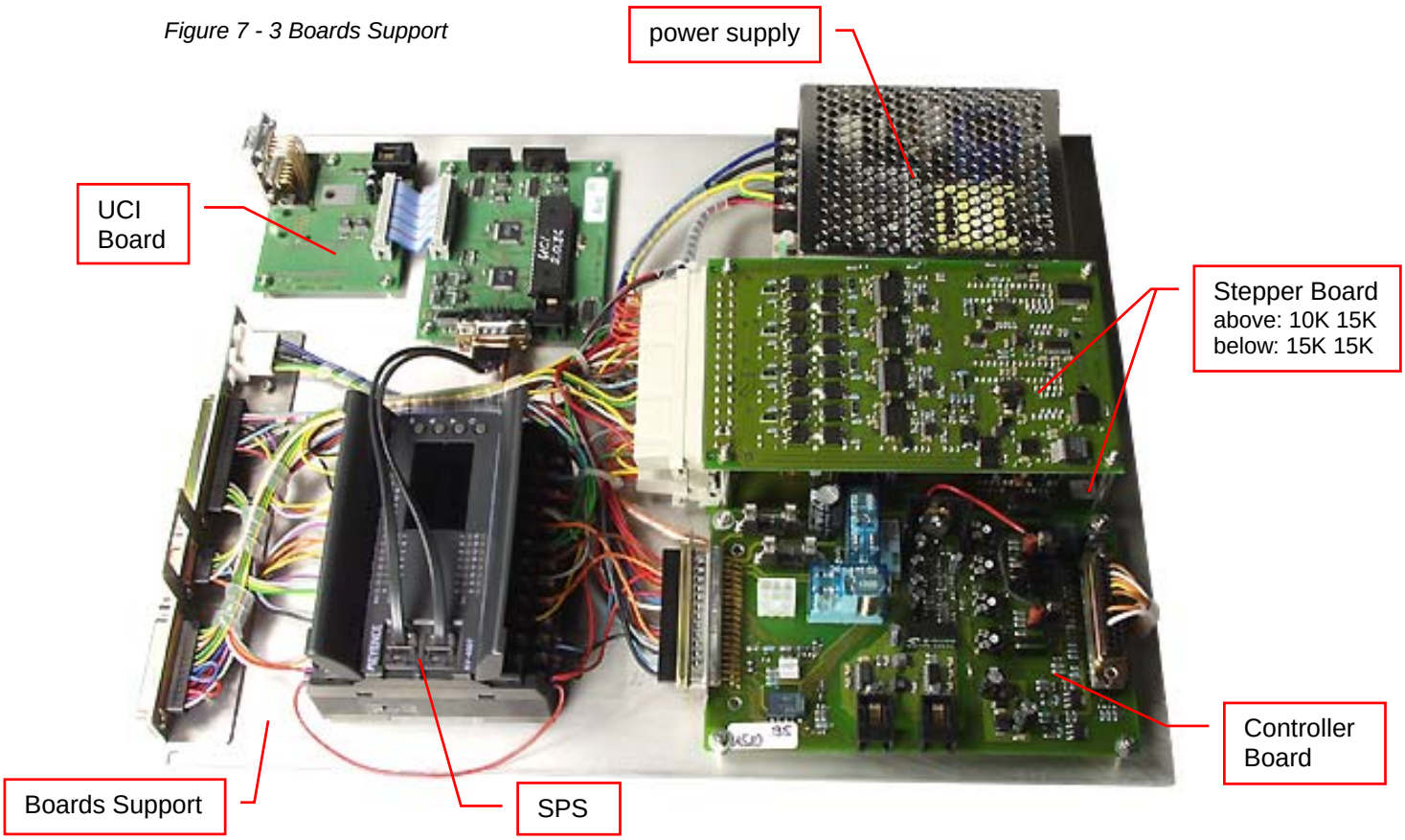
For replacement of Controller Board and Stepper Board, unscrew Boards Support to gain access to screws. Pull Boards Support out from under the Rotating Plate.

Figure 7 - 2 Boards Support, unscrewing

Remove Cover

Unscrew Boards Support

Figure 7 - 3 Boards Support



7.2.2 Lift Assembly

Removal

Figure 7 - 4 Spare part 'Lift Assembly'

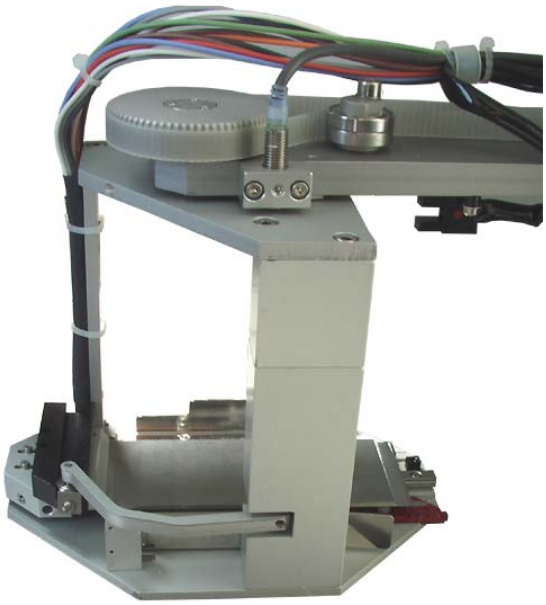


Figure 7 - 5 Shovel Positioning Sensor

Unscrew Shovel Positioning Sensor.

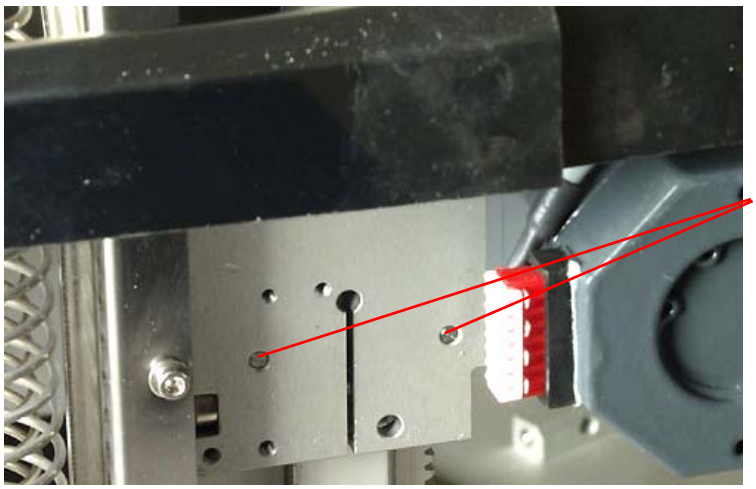
Figure 7 - 6 Lift Assembly, preparation for removal

Disconnect Shovel Motor.

Unscrew Plate Detection Sensor
bracket with sensor and 2 cable clamps.

Hold Scanner, unscrew and remove scanner bracket.

Figure 7 - 7 Lift Assembly, removal



Install

Secure the two screws fixing the Lift Assembly (see Figure 7 - 7) with Loctite 243.

Install in reverse order.

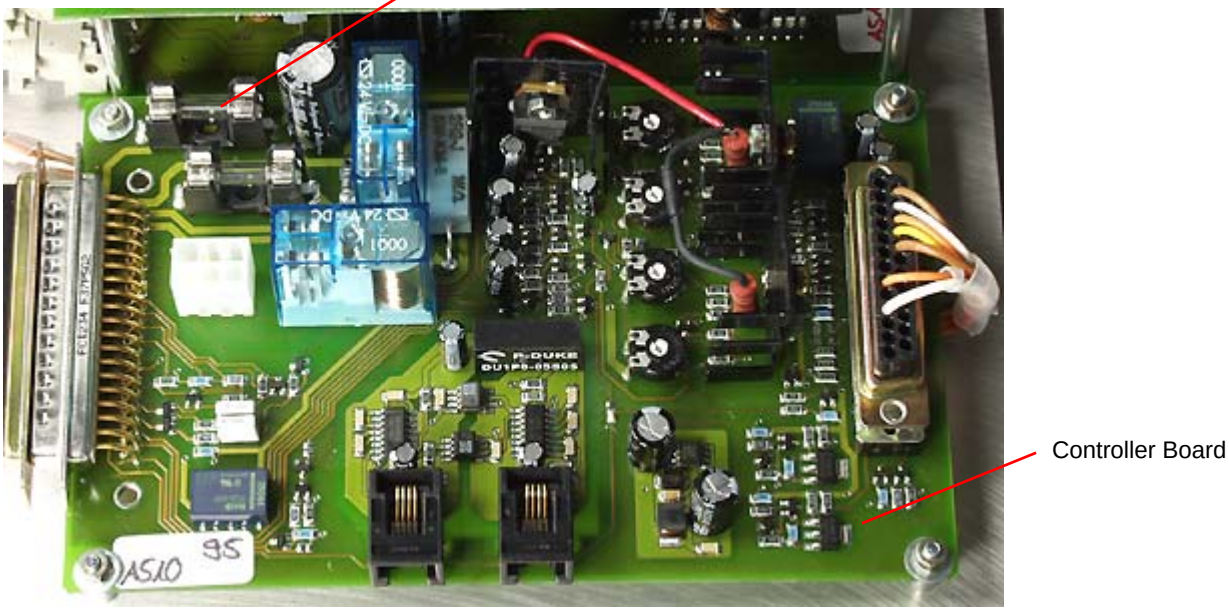
For Adjustment, see Section 7.3.

7.2.3 Fuse

Fuse: 3.15 AT

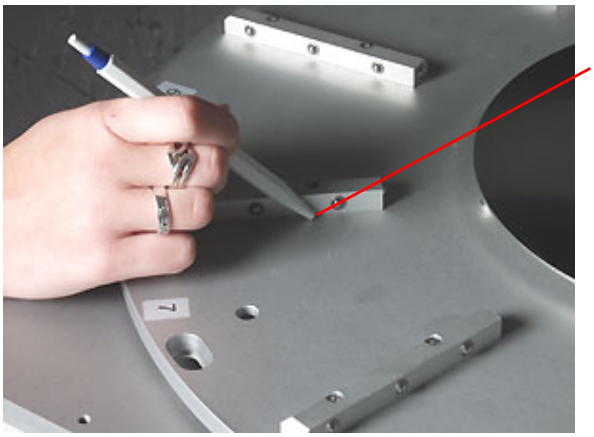
The fuse socket is on the Controller Board.

Figure 7 - 8 Fuse, location



7.2.4 Stack Positioning Rail

Figure 7 - 9 Stack Positioning Rail

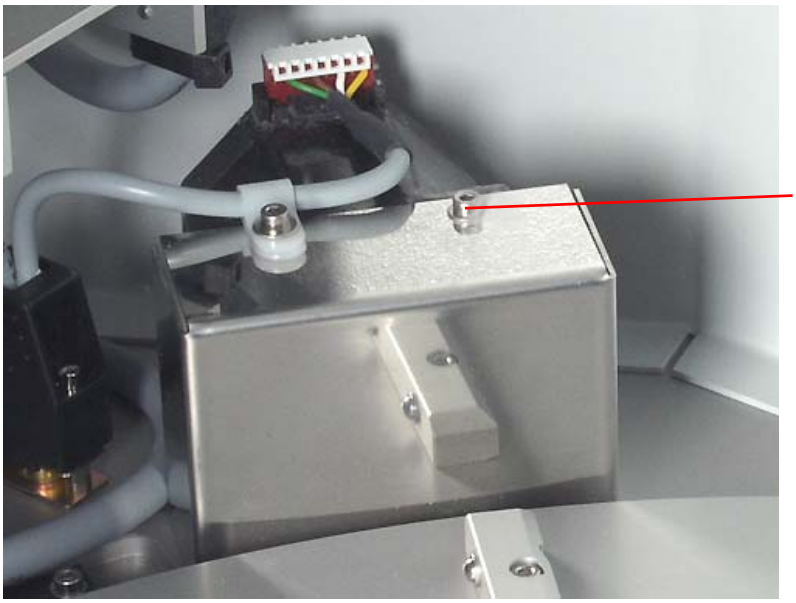


Mark exact position of Stack Positioning Rail before removing it.

Make sure the new Stack Positioning Rail is in exactly the same position as the old one was.

7.2.5 Belt

Figure 7 - 10 Belt Replacement

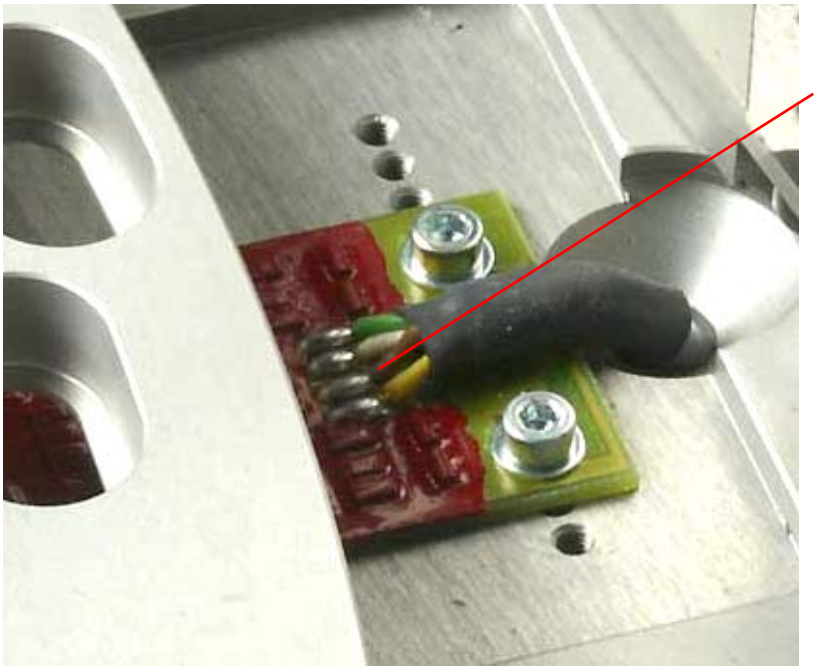


Loosen the motor mounting screws, so as to slip the belt out under the motor pulley.

After installation, tighten belt as described in Section 7.3.5.

7.2.6 Rotating Plate Sensor

Figure 7 - 11 Rotating Plate Sensor Replacement



Remove sensor cover.

Note the wire color coding, then use a soldering iron to remove the 4 wires.
Unscrew and remove the sensor.
Install in reverse order.

7.3 Adjustments

7.3.1 Shovel position

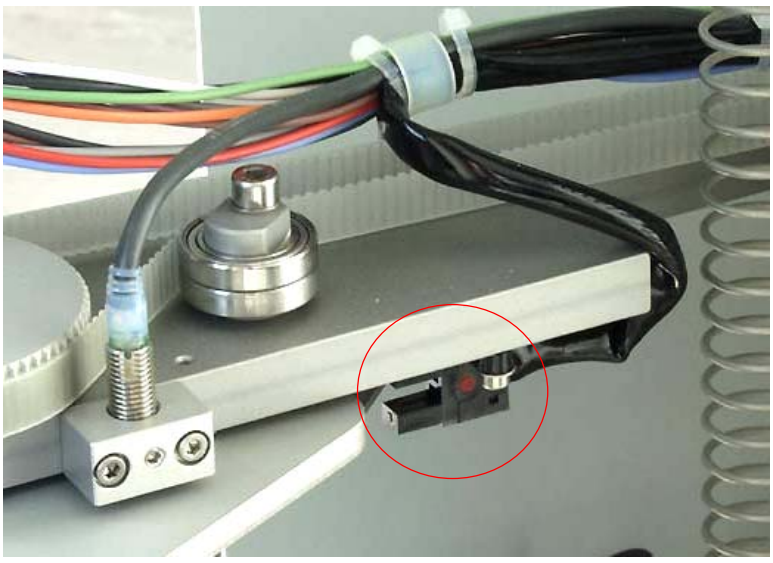
In the 0-position, the shovel shall not protrude from the lift frame.

Figure 7 - 12 Shovel 0-position

incorrect *correct*

To adjust the 0-position, proceed as follows:

Figure 7 - 13 Shovel Positioning Sensor



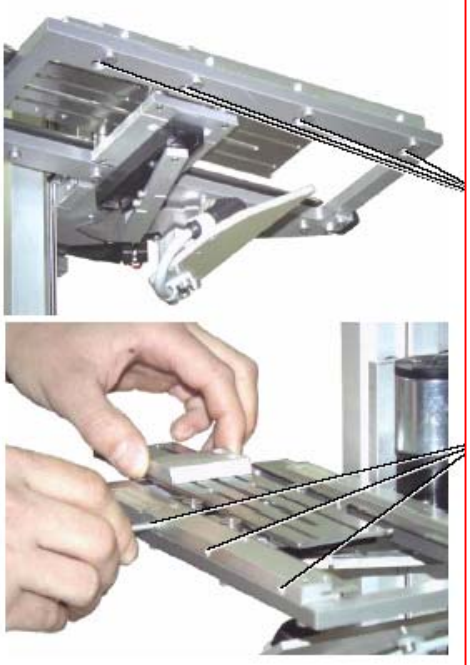
Loosen the two screws fixing the Shovel Positioning Sensor.

If the shovel is too far to the right, slightly turn the sensor CW and vice versa.

Tighten sensor screws.

7.3.2 Shovel play

Figure 7 - 14 Shovel Play Adjustment



Loosen the four screws (counterbored).

Insert four screws M4 x 20 into lateral holes. Tighten/loosen them while moving shovel forth and back until there is no more play but shovel still moves smoothly.

Tighten the four screws underneath.

Remove the four adjusting screws.

7.3.3 Shovel sensor height adjustment

Figure 7 - 15 Shovel Sensor

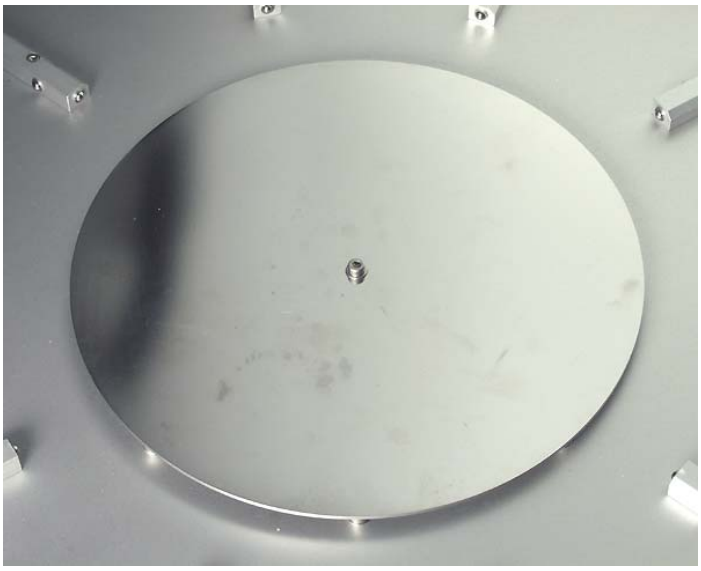
Loosen set screw fixing the shovel arm to the motor shaft.

Center the disk in the sensor slot and thighten set screw. Use Loctite 243.

7.3.4 Rotating plate play

If there is play in the Rotating Plate, proceed as follows:

Figure 7 - 16 Rotating Plate Play Adjustment



First tighten central screw.

Then tighten the two set screws.

7.3.5 Belt tension

Figure 7 - 17 Belt Tension

Loosen front right motor fixing screw

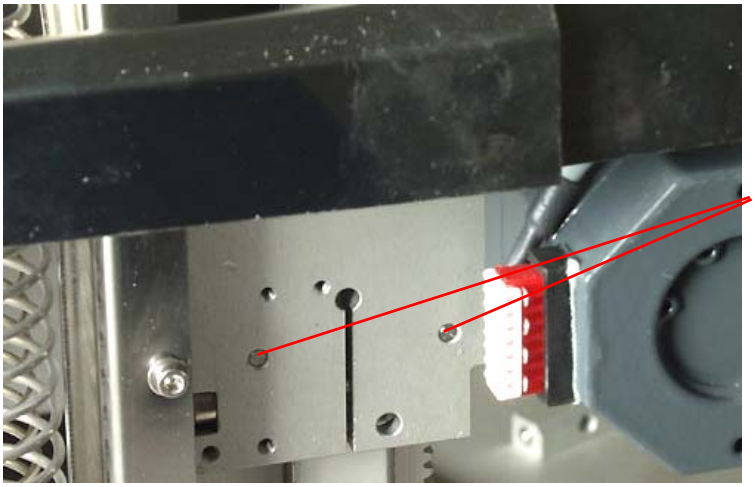
Turn Eccenter using 13 mm wrench
until Belt is fairly tight.

NOTE

Do not overtighten the Belt as this could lead to defect bearings.

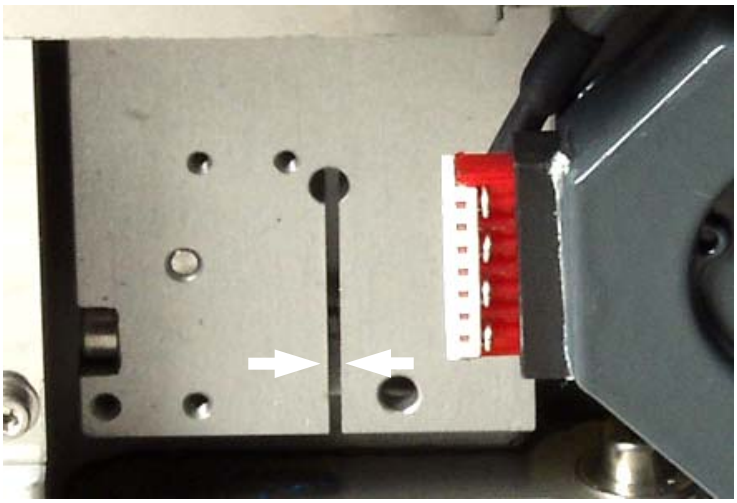
7.3.6 Lift Guide Play

Figure 7 - 18 Lift Guide Play Adjustment



Slightly tighten these two screws to eliminate Lift Guide play.

NOTE: The screws are secured with Loctite 243.

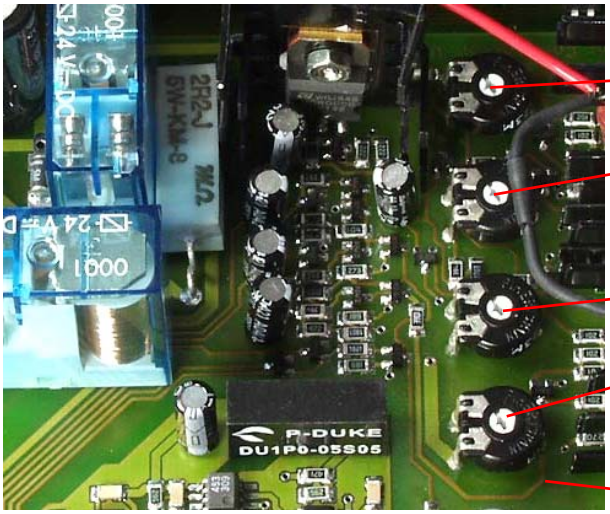


7.3.7 Shovel Force and Speed

Shovel Force: Increase if shovel movement is irregular or too weak.

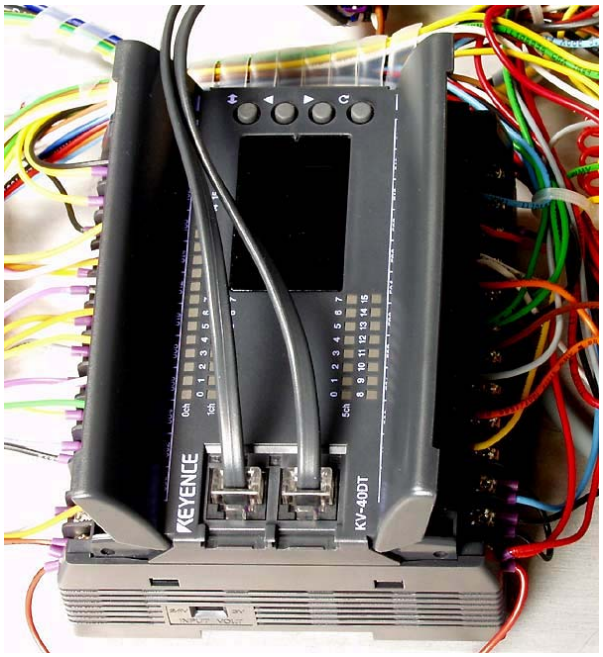
Shovel Speed: Increase if shovel movement is too slow. Caution - if set too fast, sensor becomes inaccurate, shovel might not stop in the correct position!

Figure 7 - 19 Shovel Force Adjustment


Turn CW to increase **shovel force (2.5k)**
Turn CW to increase **shovel speed (10k)**
Turn CW to increase **shovel force (2.5k)**
Turn CW to increase **shovel speed (10k)**
Controller board
P-DUKE
DU1P0-05S05

7.3.8 LED Status PCL Connector

Figure 7 - 20 PCL Connector



Position	LED Status 0ch
Z-Lift home pos.	4 on
Shovel load pos.	2 on / 3 off
Shovel home pos.	2 off / 3 off
Shovel unload pos.	2 off / 3 on
Plate detected	5 on
No plate detected	5 off
Stack detected	1 on
No stack detected	1 off

7.4 LPT.exe

LiCONiC supplies the test software from the original manufacture of the Carousel "as is". This software can be useful for exercising and troubleshooting the Carousel as well as sending direct commands.

7.4.1 Installation

Copy the program on the Compact Disc supplied at the end of the manual to your PC.

7.4.2 Program Description

To start the Carousel Test Software, select *Start / Run* from the Windows Start Menu, enter the path and program name where the *lpt.exe* was copied and the program will start in its own window. If communication with the Carousel is not immediately available, you must close the Carousel Test Software, check the cabling, power etc. and start the program again.

```
Enter Port Number to Linear-Handler [1..x] 1
Enter Port Number to Barcode Reader [0..x] 0
Enter Serial Number                  5225
Enter Operator Name                  Hans Christe

LiCONiC R&D                                23-07-99
C.G.Malin                                  11:16:38

      LinearHandler-UserSoft   *   V 1.07, 05.01.99
-------------------------------------------------------
LiCONiC AG                                 LDR 5003-1
Hans Christe                                 # 5225

         Direct Commands                   1
         Monitor Flags                     2
         Macros                            3
         Teach Positioning Times           4
         Random Positioning                5
         Test Sequence all Slots           6
         Barcode-Reading Test              7
         Random Access                     8
         Quit                              0

-------------------------------------------------------
         Enter [0..7]                      _
```

You will first be prompted to enter basic data.

If no Barcode Reader is installed, enter Port Number 0.

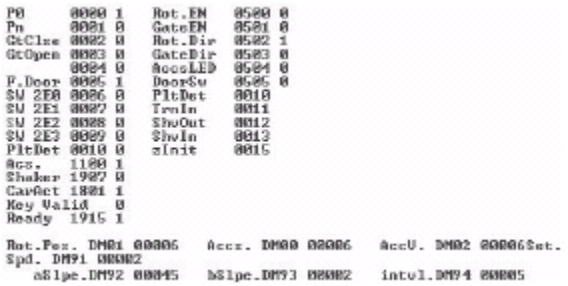
Choose any of the 8 menu items.

1 Direct commands

```
Enter direct commands to KU-PLC, press esc to quit
ST 1801
OK
RD 1915
1
RD 1814
0
WR DM0 5
OK
```

To carry out Single Commands.
See Section 7.4.3.

2 Monitor Flags



Status query of SPS-flags

0 = inactive

1 = active

Code	SPS-Flag	Description
P0	0000	Carousel 0-initiater
Pn	0001	Carousel n-initiater
GtClse	0002	Gate closed
GtOpen	0003	Gate open
	0004	
F.Door	0005	
SW 2E0	0006	Switch bit0
SW 2E1	0007	Switch bit1
SW 2E2	0008	Switch bit2
SW 2E3	0009	Switch bit3
PltDet	0010	Initiater Plate Detection
Acs.	1100	Carousel Access (automatic or manual)
Shaker	1907	
CarAct	1801	
Key Valid		Switch valid
Ready	1915	Ready-Bit
Rot.Pos.	DM01	Carousel actual position
Accs.	DM00	Carousel target position
AccV.	DM02	
Set.Spd.	DM91	
aSlpe	DM92	
bSlpe	DM93	
intvl.	DM94	
Rot. EN	0500	
GateEN	0501	
Rot. Dir	0502	
GateDir	0503	
AccsLED	0504	
Door Sw	0505	
TrnIn	0011	Initiater Handler Turn In
ShvOut	0012	Initiater Shovel FRONT
ShvIn	0013	Initiater Handler Shovel BACK
zInit	0015	Initiater Z-lift Lower Position

NOTE: Not all of the above codes apply to the LPT220. They are a summary covering options that are not available on this instrument.

3 Macros

```
Function              Command       Key

Rot. Position         WR DM0 x     1..9
Enable Rotation       WR DM0 0        0
Continue Access       ST 1902         C
End Access            ST 1903         E
CarAct ON             ST 1801         A
CarAct OFF            RS 1801         D
Inventory             ST 1908         I
System Reset          ST 1900         R

Quit                  --            esc


Error [1814]
Ready [1915]

Please Select ->
```

To send complete, prrprogrammed command sequences

4 Teach Positioning Times

```
LiCONiC R&D                                          30-07-99
C.C.Malin                                            15:40:25

      LinearHandler-UserSoft   *   V 1.07, 05.01.99

LiCONiC AG                                        LDR 5003-1
Hans Christe                                        # 5218

         RBC Positioning Times:

         Pos 0   0.0 s
         Pos 1  53.8 s
         Pos 2  66.4 s
         Pos 3  75.2 s
         Pos 4  82.4 s
         Pos 5  101.1 s
         Pos 6  97.7 s
         Pos 7  109.3 s
         Pos 8  118.0 s
```

Program to determine nominal carousel access time.

Positions the carousel at the positions 2 to 9, each time starting at 1. Lists the established times.

5 Random Positioning

```
 1 Pos: 7 Pth: 6 wt: 10 t0:97.7  t1: 9.7 te: 0.0 max: 0.0
 2 Pos: 4 Pth: 6 wt:  9 t0:97.7  t1:10.3 te: 0.0 max: 0.0
 3 Pos: 8 Pth: 4 wt:  0 t0:82.4  t1: 8.4 te: 0.0 max: 0.0
 4 Pos: 1 Pth: 2 wt:  1 t0:66.4  t1: 6.7 te: 0.0 max: 0.0
 5 Pos: 5 Pth: 4 wt:  0 t0:82.4  t1: 8.1 te: 0.0 max: 0.0
 6 Pos: 5 Pth: 0 wt:  0 t0: 0.0  t1: 0.6 te: 0.0 max: 0.0
 7 Pos: 7 Pth: 2 wt:  7 t0:66.4  t1: 6.5 te: 0.0 max: 0.0
 8 Pos: 7 Pth: 0 wt:  7 t0: 0.0  t1: 0.6 te: 0.0 max: 0.0
 9 Pos: 6 Pth: 7 wt:  2 t0:109.3  t1:11.1 te: 0.0 max: 0.0
10 Pos: 6 Pth: 1 wt:  6 t0:53.8
```

Carousel stops at random positions.

Lists the times it takes to position Carousel. If ε0.4 sec longer than the time established in Teach Positioning Times, an error message displays the deviation.

Press q to stop.

6 Test sequence all Slots

```
                ! WARNING !
! Remove all Plates from Cassettes except one !
!       Put Plate in Pos 1.1                   !

Quick Test [Y/N]    Activate Carousel
Check Ready         Enter Start Level [1]
```

Quick Test: Level 1 and 21

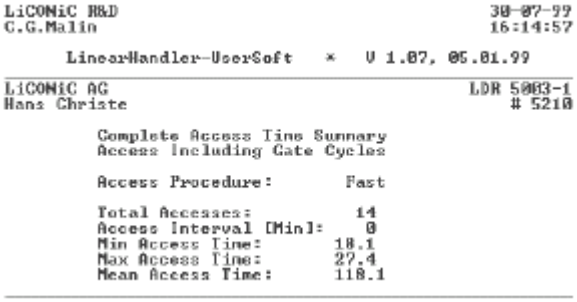
7 Barcode-Reading Test

8 Random Access

>0 = Intervall time in minutes

0 = You will be prompted for max. allowed access time

-1 = You will be prompted to enter Access Interval in sec.



Random access test.

Lists carousel access times. If ε0.4 sec longer than the time established in Teach Positioning Times, an error message displays the deviation.

Press q to stop.

7.4.3 Commands

Command Syntax

For communication only a few commands are required. A command is an ASCII-string which is sent to the controller. Response is an ASCII string sent by the controller. Note that each command is prompted by a Response string.

A command consists of command segments. The first command segment defines the intention of the command. Command segments are separated by Space (ASCII 20h). Response Segments are separated by comma (ASCII 1Ch). The table below gives a list of abbreviations used later on.

Command Segment	Mnemonics
Communication Request	CR
Communication Quit	CQ
Communication Clear	CC
Communication Finished	CF
Set	ST
Reset	RS
Read	RD
Write	WR
Write Set	WS
Data Memory	DM
Timer	T

Open / Close Communication

Prior communication with the controller, the communication has to be opened. Before the communication is opened, the controller accepts only the Open Communication Command (CR). For better safety, it is recommended to close communication (CQ) when no communication is required for a longer period of time.

	Command	Response
Open Communication	CR	CC
Send Commands (see below)		
Close Communication	CQ	CF

Controller Error Messages

In case of an error, the Controller sends one of the following messages in response to a command received. The Controller Error Messages are System Errors, not to be confused with Run or Handling Error Messages (see Handling Error Messages).

Error	Command	Response
Relay Error	Undefined timer, counter, data memory, check if requested unit is valid	E0
Command Error	Invalid Command, check if communication is opened by CR, check command sent to controller, check for interrupts during string transmission	E1
Program Error	Firmware lost, reprogram controller	E2
Hardware Error	Controller hardware error, turn controller ON/OFF, controller is faulty and has to be replaced	E3
Write Protected Error	Unauthorized Access	E4
Base Unit Error	Unauthorized Access	E5

System Status

	Command	Response
Read Ready-Bit	RD 1915	x

The Controller sends either 0 (not ready) or 1 (ready) as response "x" upon querying the Ready-Bit. In Default state, i.e. the Carousel is rotating, the Ready-Bit = 1. For safety reasons, a delay of approx. 100 ms should be provided after a command and before the first Ready querry.

CAUTION

Send Commands to the Controller only if Ready=1.

Provide a Delay of approx. 100 ms between the Command and Ready.

Basic Commands

	Command	Response
Reset	ST 1900	OK
Read Ready Flag	RD 1915	x
Read Error Flag	RD 1814	x
Activate Handling System	ST 1801	OK
Deactivate Handling System	RS 1801	OK
Read Status Handling System	RD 1801	x
Set Carrousel rotation position m (0..9)	WR DM0 m	OK
Set Handler level position n (1..21)	WR Dm5 n	OK
Continue Access	ST 1902	OK
Terminate Access	ST 1903	OK
Load Plate to m,n*)	ST 1904	OK
Unload Plate from m,n*)	ST 1905	OK
Bar-code inventory	ST 1908	OK

Response "x" upon querying the Handling-Status:

0 Carousel not activ

1 Carousel activ

m=0 Carousel rotates continually

m=1..9 Carousel stops at the respective position

Use the command *Activate Carousel* for Instrument Initialization. It was created for a controlled initial startup. Do not use this command to regularly switch the instrument on and off.

*) These functions can only be performed if the Carousel is at a defined position.

The Error Flag is set if a command could not be successfully completed within the time expected.

Recommendation: After a Time-Out Error (Ready Flag 1915 is not "1"), query the Error Flag with RD 1814.

Extended Commands

	Command	Response
Read Error Flag (default = 0)	RD 1814	x
Read Positioning Offset (default = 10)	RD T20	x, ttttt, sssss
Set Positioning Offset (default = 10)	WS T20 ttttt	OK
Read Actual Corrousel Position n (0..9)	RD DM1	nnnnn
Read Handler z-Offset (default = 100)	RD DM20	ddddd
Read Handler dz Pick & Place Movement in Cassette (default = 400)	RD DM21	ddddd
Read Handler In-Transfer z-Position (default ~ 1000)	RD DM22	ddddd
Read Handler z-Pitch (default = 1925)	RD DM23	ddddd
Read Handler Out-Transfer z-Position[1]	RD DM24	ddddd
Read Max. Number of Levels (default = 21)	RD DM25	ddddd
Read Handler dz Pick & Place Movement at Transfer Station (default = 700)	RD DM26	ddddd
Read Handler max. upper Level (default = 9999)	RD DM27	ddddd
Read Handler barcode reader z-offset (default = 1000)	RD DM28	ddddd
Read barcode reader dark-zone (default = 500)	RD DM29	ddddd
Read Handler z-Range (default = 41200)	RD DM30	ddddd
Set Handler z-Offset	WR DM20 d	OK
Set Handler dz Pick & Place Movement	WR DM21 d	OK
Set Handler In-Transfer z-Position	WR DM22 d	OK
Set Handler z-Pitch	WR DM23 d	OK
Set Handler Out-Transfer z-Position[1]	WR DM24 d	OK
Set Handler dz Pick- & Place-Movement at Transfer Station	WR DM26 d	OK
Set Handler max. upper Level (default = 9999)	WR DM27 d	OK
Set Handler barcode reader z-offset (default = 1000)	WR DM28 d	OK
Set barcode reader dark-zone (default = 500)	WR DM29 d	OK
Set Handler z-Range (default = 41200)	WR DM30 d	OK

[1] Handler: DM24 = DM22

d = data (Word=16Bit)

x = 0,1 (Word=16Bit)

t = actual value (Word=16Bit)

s = set value (Word=16Bit)

Handling Error Messages

Error Commands are used when the Carrousel Handling detects an internal error (e.g. when loading a plate to an occupied location). In case of error the Error Flag (1814) is set from '0' to '1'. The exact cause of an error can be found in the data memory 200 (DM200). For each type of error an error code is set in DM200. The list below shows the meaning of the error code.

Errors are read by reading the content of DM200. On a time-out, first the Error Flag is read (RD 1814). Then DM200 is read in order to find the cause of error. An error is reset by sending the Reset Command (ST 1900).

Errors DM200=1xx are Load Plate Errors, errors DM200=2xx are Unload Plate Errors.

	Command	**Response**
Read Error Flag (default = 0)	RD 1814	x
Read Error Code	RD DM200	x

Error	**Cause**	**Code**
Read Load Plate Carousel Positioning Error	Carousel could not reach desired radial position during Load Plate procedure or Lift could not reach transfer level during Load Plate procedure.	00100
Read Load Plate Shovel Transfer Back Error	Shovel could not reach back position at transfer level during Load Plate procedure.	00101
Read Load Plate Shovel Transfer Center Error	Shovel could not reach center position at transfer level during Load Plate procedure.	00103
Read Load Plate Lift Cassette Travel Error	Lift could not reach desired cassette level during Load Plate procedure.	00105
Read Load Plate Shovel Cassette Front Error	Shovel could not reach front position on cassette access during Plate procedure.	00106
Read Load Plate Lift Cassette Place Error	Lift could not reach cassette place level during Load Plate procedure.	00107
Read Load Plate Shovel Cassette Center Error	Shovel could not reach center position at cassette plate placement during Load Plate procedure.	00108
Read Load Plate Lift Travel Back Error	Lift could not reach lower level during Load Plate procedure.	00109
Read Load Plate Lift Init Error	Lift could not be initialised after Load Plate procedure.	00110
Read Unload Plate Carousel Positioning Error	Carousel could not reach desired radial position during Unload Plate procedure or Lift could not reach desired cassette level during Unload Plate procedure.	00200
Read Unload Plate Shovel Cassette Front Error	Shovel could not reach front position on cassette access during Unload Plate procedure.	00201

Error	Cause	Code
Read Unload Plate Lift Cassette Pick Error	Lift could not reach cassette pick level during Unload Plate procedure.	00202
Read Unload Plate Shovel Cassette Center Error	Shovel could not reach center position at cassette plate placement during Unload Plate procedure.	00203
Read Unload Plate Lift Transfer Travel Error	Lift could not reach transfer level during Unload Plate procedure.	00205
Read Unload Plate Shovel Transfer Back Error	Shovel could not reach back position at transfer level during Load Plate procedure.	00206
Read Unload Plate Shovel Transfer Center Error	Shovel could not reach center position at transfer level during Unload Plate procedure.	00208
Read Unload Plate Lift Travel Back Error	Lift could not reach lower level during Unload Plate procedure.	00209
Read Unload Plate Lift Init Error	Lift could not be initialised after Unload Plate procedure.	00210

d = data (Word=16Bit)

x = 0,1 (Word=16Bit)

8 Spare Parts List

Part No.	Description
619 605	Y/B Board
619 607	Decoder board
619 610	Laser Scanner
619 616	Rotating Plate Sensor
619 617	Lift Assembly
619 618	Controller Board
619 619	Stepper Board
619 620	PLC Controller
619 621	Stack positioning Rail
619 623	Belt